Artillery and Counterinsurgency:
The Soviet Experience in Afghanistan

by Lieutenant Colonel (Retired) Lester W. Grau, IN

The leverage that technology offers depends on combat circumstances, such as the theater, opponent and objective. Guerrilla war, a test of national will and the ability to endure, negates many of the advantages of technology.

The Russian Army and its predecessor, the Soviet Army, fought the most recent, large-scale counterinsurgencies pitting technologically advanced mechanized forces against dedicated guerrillas. The Russians are publishing many of their lessons learned now. Although some of these have no direct application to the United States Army, others do; military professionals need to be aware of how other militaries attempt to solve contemporary problems.

The Soviet Army invaded Afghanistan on Christmas Eve 1979 with tables of organization and equipment (TOE) divisions equipped and trained to fight conventional, maneuver warfare on rolling plains. It came to replace an ineffective communist leader, not to fight an insurgency. It planned to stabilize the situation, occupy garrisons and assist the Afghanistan government while the Afghan government forces fought the guerrilla resistance.[1]

Soon, however, "mission creep" set in, and Soviet forces were locked in a counterinsurgency fight in rugged mountains and desert—a fight for which they were neither equipped nor trained. The technologically superior Soviet Ground Forces were trained to rely heavily on massed artillery, firing normative fires to shatter the defenses of a stationary enemy prior to the attack.[2] The Mujahideen guerrillas did not accommodate the Soviet gunners by occupying linear defenses or staying in place.

Throughout the war, the Soviet Army continued to rely on artillery and close air support (CAS) as a substitute for ground maneuver and close combat. The Soviet 40th Army needed a lot of light infantry but chose instead to expend massive firepower to save soldiers' lives and compensate for its lack of infantry. It was an expensive, indiscriminate and ineffective policy.[3]

As the war progressed, the Soviets adapted their tactics, training and force structure to fight the Mujahideen more effectively, and artillery played a significant role in their evolving counterinsurgency tactics, techniques and procedures (TTP).

The "God of War" in Afghanistan

Artillery, the Russian God of War, was a dominant part of Soviet ground combat power. Many analysts described Soviet Ground Forces as an artillery army with a lot of tanks.

The Soviet divisions brought their tanks and artillery to Afghanistan. The tanks proved of limited value. Although the artillery proved of greater value, the target set presented by the Mujahideen was often difficult to engage and of limited tactical value. Soviet firing tables and norms were developed for high-intensity war fought on relatively flat terrain by mechanized forces against mechanized forces.[4] Faced with a different war on different terrain and a different enemy, Soviet gunners initially had difficulty in quickly engaging targets—the "hip shoot" was not a normal mission.

Soviet artillery planning was designed to physically obliterate defending forces within square hectares by normative fires involving hundreds of rounds massed in a small area. When the Soviet gunners used these normative fires in Afghanistan, they had little impact on the guerrillas.[5]

During the course of the war, the Soviet artillerymen developed new firing techniques, nomographs and firing tables to cope with the enemy, mountains and desert.[6] They found that new technology, such as precision-guided munitions (PGM) and scatterable mines, offered some tactical advantages but no decisive advantage in counterinsurgency.

They also found that mortars were frequently better than howitzers in hit-

ting caves and terrain folds. Howitzers were usually of more value than gun/howitzers and guns in the mountains. Multiple rocket launchers (MRLs) were particularly effective against dismounted Mujahideen.

A constant problem was detecting and engaging targets rapidly enough to be effective. Throughout the war, Soviet gunners were hampered by a lack of tactical intelligence that could rapidly identify a viable target set and pass the data to the guns before the target disappeared.

Large-Scale Operations. Artillery planning for large-scale operations in Afghanistan was the most similar to regular Soviet artillery planning. Artillery planners would form regimental artillery groups (RAGs), brigade artillery groups (BrAGs), division artillery groups (DAGs) and army artillery groups (AAGs) as needed.[7] The Soviet Army used massed artillery to suppress or destroy enemy positions and seal the area to prevent escape by firing remotely delivered mines onto escape routes.

Soviet commanders started each sweep with an artillery preparation and advanced in contested areas behind a wall of artillery fire. Despite proclamations to the contrary, they apparently showed little concern for the civilian population and used artillery indiscriminately in and around villages.[8]

Support of Tactical Units. Soviet artillery missions in Afghanistan included counterbattery, artillery preparation and support, blocking fire, sweeping fire in blocked areas, harassing and interdiction fire, illumination support and direct fire.[9] Counterbattery was often ineffective.

Approximately 85 percent of the Soviet force usually was engaged in some form of security. Forces guarded base camps, airfields, logistical centers, cities, district headquarters, garrisons, depots and government facilities the Mujahideen frequently attacked with mortars and rockets. The Mujahideen fired and moved before Soviet counterbattery could respond.

Artillery positioned in firebases supported defensive security missions in a general support (GS) role. These firebases were mutually supporting and located 10 to 15 kilometers apart.[10]

Soviet offensive artillery support included GS, reinforcing (R) and attached. The artillery fired to protect march columns, protect advances, prepare for attacks in cities and villages, support block and sweep (search and destroy) missions, and provide indirect and direct fires during combat.

When regiments and brigades went on the offensive, they employed their organic artillery and any artillery positioned within supporting range. Artillery attached to a regiment or brigade was usually reattached in direct support (DS) of a battalion.

When artillery was attached DS, the most common attachment was an entire artillery battalion to a maneuver battalion.[11] Sometimes a howitzer battery and MRL battery supported a maneuver battalion. Often Soviet commanders attached a battery to a separate maneuver company.

Mortars (part of Soviet artillery) often were attached to maneuver companies. The 82-mm Vasilek automatic mortar batteries that provide both an indirect and direct fire were particularly welcome by maneuver units.[12]

Soviet artillery protected maneuver units during movement. Prior to a movement-to-contact, Soviet artillery planners learned to plan fires on likely ambush spots. Further, if the Soviet force had to move through a narrow valley or defile, artillerymen planned parallel barrage fires along the axis of advance some 300 to 400 meters away from the road. If several artillery groups supported an advance, the planners created a continuous fire corridor to protect the advancing force.[13]

The Soviet Army used large quantities of artillery fire to protect advancing forces. One Soviet airborne battalion decided to advance behind tanks and personnel carriers through a narrow, 14-kilometer-long forested zone to clear it of Mujahideen. The tanks and personnel carriers were to protect dismounted paratroopers. However, the Mujahideen had rocket propelled grenade (RPG) antitank launchers, called RPG-7s, that endangered the vehicles. The paratroop battalion had an artillery battalion attached, so an artillery officer from a battery moved with each paratroop company to adjust fires.

The artillery kept a protective wall of fire in front of the ground force as it slowly advanced through the area. The indirect artillery fire and the direct fire of the armored vehicles protected the Soviet men and vehicles and prevented the Mujahideen from taking carefully aimed shots. During the course of the three-day advance, the defending Mujahideen fired more than 40 RPGs at the vehicles but did not seriously damage any of them.[14]

The Soviet combatants used artillery preparations before attacking cities and villages. Their indirect artillery fire hit suspected guerrilla strongholds and assembly areas while direct fire artillery hit snipers and firing points. Artillery also fired blocking fires or scatterable mine fields to seal the populated areas and prevent the guerrillas from escaping or bringing in reinforcements. Consequently, civilian casualties were high. Russian assessments recommended using PGM, antitank guided missiles with fragmentation warheads and artillery rounds with a reduced bursting radius to decrease civilian casualties in future city fighting.

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Unlike conventional Soviet attacks that conducted artillery fires by phases and a time schedule, the Soviet planners learned that, in city fighting, they could not plan fires to a time schedule; they only could plan on-call fire support for the attacking force. They also learned to use blocking fires to help secure areas just cleared or prevent counterattacks.[15]

The Soviet combatants used artillery to support block and sweep missions designed to find guerrillas in the countryside. Again, artillery sealed the flanks through which the guerrillas might escape. Sweeping fire preceded the searching Soviet ground forces even when there was no indication that the Mujahideen were present.[16] Further, Soviet artillery concentrated on mountain passes, gorge exits and road or trail intersections when supporting a ground maneuver unit.[17]

In theory, all Soviet combat arms officers could adjust indirect artillery fire, but practice constantly demonstrated that non-artillery officers were not up to the challenge or not trusted to do so. Commanders refused to authorize indirect fire support adjusted by a maneuver officer unless he knew his *exact* position (cases exist where maneuver commanders knew their positions to within 50 meters but were denied needed indirect artillery fire support).[18]

Further, the number of forward observers (FOs) and fire direction officers (FDOs) assigned by TOE were not enough to support forces deployed in a counterinsurgency. FOs had to be in battalions and separate companies.[19] FDOs had to be available to accompany separate firing batteries and separate firing platoons because the terrain could not always accommodate an entire artillery battalion.

Because the artillery battalion was the base or planning unit of the Soviet Army, Soviet artillerymen were not used to deploying split-fire direction centers (FDCs), a requirement in the rugged terrain of Afghanistan. The Soviet Army never could train its maneuver officers sufficiently to solve its indirect-fire-adjustment problem, so it assigned additional FOs and FDOs from the Soviet Union to its 40th Army in Afghanistan throughout the war.

Maneuver officers could, however, readily adjust direct, observed fire; direct fire was a common offensive mission for artillery attached to maneuver units. Armored, self-propelled artillery was preferred for direct fire missions, but towed or unarmored artillery also was used in this role.

The unarmored BM-21 MRL often was used when other direct fire failed to dislodge the enemy. The truck-mounted BM-21s usually were moved into direct firing positions under the protection of an air strike, and each fired its 40 122-mm rockets immediately after the air strike ended. The guerrillas in the impact area who survived were normally unable or unwilling to return fire on the BM-21s as the MRLs pulled out of their firing positions to reload.[20]

Battalion and Company Raids. The 2S1 122-mm self-propelled howitzer and 2S9 120-mm self-propelled howitzer/mortar were best suited to support raiding motorized rifle or air assault forces. They usually deployed by battery or battalion.

Before a raid, the Soviet planners determined initial targets from aerial, visual and artillery reconnaissance. They usually fired a three- to five-minute artillery preparation on those targets.

If the Mujahideen opened fire on Soviet forces in the course of the raid, the Soviet gunners quickly tried to engage the target before it could escape by registering with one or two ranging rounds and then firing massed artillery fires on the target using normative firing tables for suppression or assured destruction.

While pitched battles occurred, the most common activity for raiding Soviet forces was pursuing a withdrawing enemy. Mujahideen usually left a rear guard to slow down the attacker while the main body escaped. The rear guard tried to stay within 200 to 300 meters of the Soviet force to escape Soviet air and artillery. In that case, the Soviet FO spotted his first round some 200 meters beyond the enemy and then walked the rounds back onto the enemy.[21]

Once the Soviet leadership introduced the laser-guided *Smel' chak* [Daredevil] mortar round into Afghanistan, the massive 2S4 self-propelled 240-mm mortar proved effective in destroying Mujahideen strongpoints and fortifications located in caves and terrain folds that howitzers could not hit.

In June 1985, Senior Lieutenant A. Beletskiy employed his 2S4 battery against a Mujahideen stronghold that artillery could not engage. The stronghold was located near the Pandshir Valley and garrisoned by Mujahideen of Ahmed Shah Masood. Lieutenant Beletskiy used a laser rangefinder to determine that the distance from the target was 2,350 meters. He then fired a conventional high-explosive (HE) spotting round, evidently to establish the PGM footprint. He adjusted his firing data and then fired a ground laser-guided *Smel' chak* round. It hit the target exactly. The 2S4 battery destroyed the Mujahideen stronghold with just 12 rounds.[22]

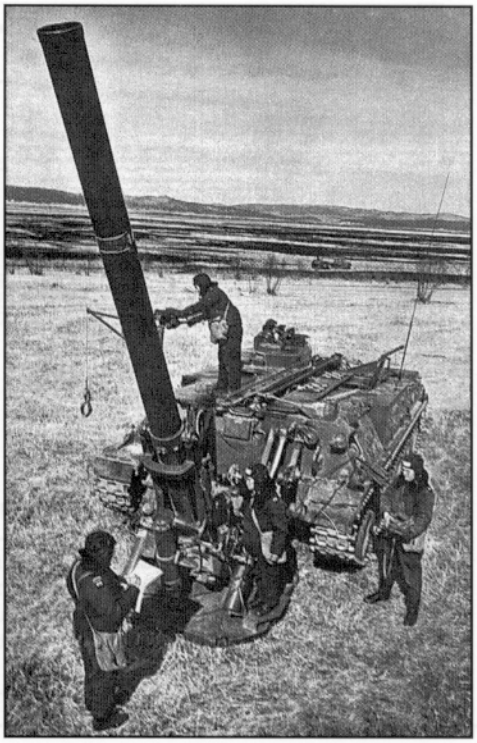
began to withdraw downhill, Soviet artillery would hit the reverse slope of the mountain crest that the Soviet force was on as well as the flanking slopes of mountains possibly occupied by the enemy and surrounding peaks and trails. As the Soviet force began to withdraw, Soviet artillery fire shifted to the crest of the mountain that the Soviet force was on. As the Soviet force withdrew, Soviet artillery fire gradually shifted downhill in a series of lines some 150 to 200 meters apart. The Soviet artillery continued to hit the mountain and its surroundings until the Soviet maneuver force completed its descent and was some three kilometers from possible Mujahideen small-arms fire.[23]

Artillery Ambush. The Soviet gunners used towed artillery—the D-30 122-mm howitzer, MT-12 100-mm antitank guns and vehicle-mounted antitank-guided missiles—to provide base camp security and protect outposts and government installations. Artillery observers, usually located on high ground, found targets and adjusted fire during the day.

At night, target acquisitions and engagements were difficult, but Soviet reconnaissance troops employed their *Realii-U* sensor to detect unobserved targets. The *Realii-U* is a seismic motion detector that allows the operator to determine the number and type of objects moving near it. Soviet planners used the *Realii-U* to aid in the defense, monitor the security zone and support the artillery ambush.[24]

A D-30 122-mm howitzer platoon leader conducted a successful artillery ambush in February 1986 near the town of Talukan in the northeast province of Takhar. Lieutenant V. Kozhbergenov installed the *Realii-U* sensor near a Mujahideen supply trail he couldn't see from his platoon observation post (OP)—see the map on Page 40. He then plotted three artillery concentrations (110, 111 and 112) spaced 100 to 150 meters apart along the trail and computed the firing data for each. The platoon leader plotted concentration 111 at the narrowest part of a valley. He then periodically used the DMK assault meteorological set to calculate the meteorological report to adjust his data (the report is good for an hour).[25]

At night, the *Realii-U* operator reported that some 10 to 15 people, two trucks and five pack animals were passing through concentration 112. The platoon leader ordered "Fire Mission." His



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gunners stood by their pieces. As the Mujahideen approached concentration 111, the gunners fired a volley into 111. Then, the first piece switched to fire concentration 110 and the third to fire concentration 112. Number two gun continued to fire on concentration 111. The platoon expended 12 rounds and destroyed two Toyota trucks and killed four pack animals and six men as well as destroying small arms and ammunition.[26]

Soviet commanders also planned artillery fire in support of ground ambushes. Ground ambush planning often included artillery illumination fire, fire on the kill zones, fire on probable enemy assembly areas after their withdrawal from the kill zone and fires to break contact with the enemy.[27]

Convoy Security. The Soviet lines of communications (LOC) stretched more than 1,600 kilometers across inhospitable terrain. Almost all Soviet supplies traveled over a tenuous road network that tied down 15 of the 93 battalions of the Soviet 40th Army in perpetual LOC security. Other battalions provided convoy and march security to the vehicles that slowly drove from the Soviet border to the forward garrisons and back.[28] Artillery contributed to LOC security by providing convoy escorts and fire support and accompaniment.

In the escort role, self-propelled artillery was dispersed throughout the march column among tanks and armored personnel carriers. These weapons systems remained within direct fire support distance of each other. If the Mujahideen ambushed the column, the artillery pieces, tanks or armored personnel carriers within the kill zone stopped and returned fire while the trucks drove out of the kill zone.[29] Artillery pieces had advantages over tanks in mountainous terrain because their main gun tubes have far greater elevation.

Artillery assigned in fire support and accompaniment moved with the column in three groups (normally batteries, but sometimes battalions). The first group moved at the head of the column, the second in the middle of the column and the third at the end. Artillery FOs were spaced every 10 to 15 vehicles throughout the column. This spacing ensured continuous fire support, even when distance gaps developed.

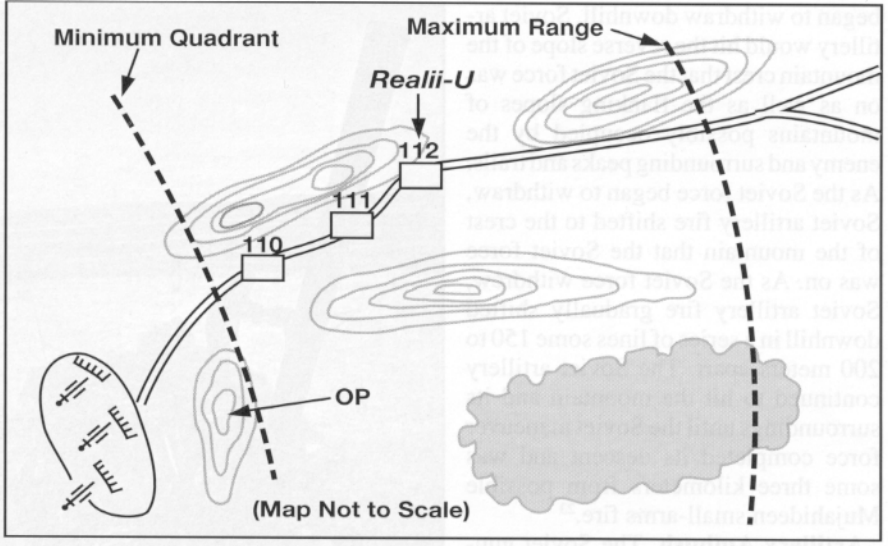
As the column started to march, the artillery stationed at the start point provided initial support. As the column reached the maximum effective range of the supporting artillery, the second artillery group deployed into firing positions, usually within the artillery fan of the supporting artillery. The second group then provided fire support as the third artillery group leapfrogged forward to the middle of the column. As the end of the column passed the second artillery group, the head of the column came near the maximum effective range of the second artillery group. The third artillery group then occupied firing positions, and the second firing group rejoined the column. The Soviet artillery would continue this procedure until the march column closed into an assembly area.[30]

The Mujahideen usually tried to ambush a convoy near the front to stop it and destroy forward control elements. When possible, the Mujahideen cut a convoy into pieces and tried to destroy the pieces systematically. The forward positioning of the first artillery group often allowed its convoy to engage the ambushing force by direct fire. FOs also called in indirect fire on the ambush in an effort to defeat or annihilate the attacker.[31]

Conclusion

The Soviet generals attempted to substitute firepower for ground maneuver. They did not deploy enough infantry to Afghanistan and most were motorized rifle forces hard-pressed to fight far from their carriers. The Soviet leadership needed to use infantry aggressively to engage the Mujahideen and prevent the enemy withdrawal, but Soviet political decisions, security duties and force structure prevented assigning sufficiently, trained light infantry to conduct offensive mountain combat. Soviet gunners tried to "pick up the slack" and lost 433 artillery pieces and mortars fighting the Mujahideen.[32] But fire without maneuver cannot be decisive.

There are some lessons that US artilleryman should take from the Soviet experience in Afghanistan. First, counterinsurgency requires innovative think-



Artillery Ambush. The Russians used the *Realii-U* seismic motion sensor to detect unobserved targets. Shown here is an actual plan for such an ambush. Fire concentrations were plotted (110, 111 and 112) along a Mujahideen supply trail out of view from the observation post (OP). When the *Realii-U* detected enemy movement, the Russians fired the concentrations.

Notes:

1. Aleksandr A. Lyakhovskiy, *Tragediya I Doblest' Afghana* [*The Tragedy and Valor of the Veterans of Afghanistan*], (Moscow: Iskona, 1995), 116. General Lyakhovskiy served with the General Staff Operations Group supporting the Soviet 40th Army during 1987-1989.
2. Normative fires are the number of expended rounds required to guarantee mission accomplishment. These are mathematically and field-test proven and are expressed as the numbers of rounds fired by type of artillery system within a specified time to produce a guaranteed percentage of kill. Soviet artillery missions are assigned in terms of annihilation, destruction, neutralization and harassment fires. The first three missions are given in normative fire terms.

Annihilation [*unichtozheniye*] consists of inflicting such losses or damage on a target that it completely loses its combat effectiveness. In the annihilation of unobserved targets, fire is conducted until a designated number of shells is expended, assuring a 70 to 90 percent kill probability of individual targets or the mathematical expectation of 50 to 60 percent of targets destroyed in a group target. The implication is that the target is so damaged it cannot be reconstituted and is incapable of even token resistance.

Destruction/demolition [*razrusheniye*] consists of putting a target in an "unfit" condition. The implication is that the target is so damaged it cannot be reconstituted without a significant expenditure of time and resources and is capable only of sporadic and uncoordinated resistance.

Neutralization/suppression [*podavleniye*] involves inflicting such losses on a target and creating such conditions by fire that the target is temporarily deprived of its combat effectiveness, its maneuver is restricted or prohibited or control is disrupted. In neutralizing an unobserved group target, the expenditure of a norm of rounds assures the mathematical expectation of 30 percent of the targets destroyed. The implication is that the target is severely damaged but would be capable of eventual coordinated resistance after the suppression fire is lifted.

Information taken from G. E. Peredel'skiy & M. P. Kankov, *Artilleriyskiy Divizion v Boyu* [*Artillery Battalion in Combat*], Moscow: Voyenizdat, 1989, 20-21.

For example, annihilation normative fire against a single artillery piece is 300 rounds of 122-mm howitzer ammunition, 200 rounds of 152-mm howitzer ammunition or 360 rounds of 122-mm MRL ammunition. Neutralization normative fire against a enemy strongpoint occupying one hectare of ground is 200 rounds of 122-mm howitzer ammunition, 150 rounds of 152-mm howitzer ammunition or 240 rounds of 122-mm MRL ammunition. Information extracted from tables in V. Ya. Lebedev, *Spravochnik Ofitsera Nazemnoy Artillerii* [*Field Artillery Officer's Handbook*], Moscow: Voyenizdat, 1984, 373-375.

3. Lester W. Grau, *The Bear Went Over the Mountain: Soviet Combat Tactics in Afghanistan* (Washington: National Defense University Press, 1996), 52.
4. Lester W. Grau, "Soviet Artillery Planning in the Tactical Defense" (Fort Leavenworth: Soviet Army Studies Office, 1990).
5. Soviet-style normative fires proved very effective when the Mujahideen reverted to conventional tactics. After the Soviet withdrawal, the communist Afghan government forces unexpectedly held on for several years. The Mujahideen guerrillas adopted conventional linear tactics to attempt to take the cities of Kabul and Jalalabad. The communist forces, using normative artillery fires, decimated the Mujahideen and delayed a Mujahideen victory by at least a year. See Makhmut Akhmetovich Gareev, *Moya Poslednyaya Voyna* [*My Final War*] (Moscow: Insan, 1996), 232-233, 248.
6. Nomographs are planning charts showing numerical relationships. The Soviets had literally hundreds of tactical nomographs that allowed commanders or staffs quickly to determine march times, the most effective systems for rapid artillery annihilation of an area target, the length of time a firing position can be safely occupied during a fire mission, etc. Most of the nomographs changed due to the terrain of Afghanistan.
7. Grau, *The Bear...*, 20, 37, 50, 61, 68, 79, 82 and 90. Occasionally, due to terrain or range considerations, artillery groups split, an uncommon occurrence for regular Soviet forces in Europe but a common one for US artillery.
8. Ibid, 44-46 and 75-76.
9. M. I. Karatuev, V. A. Dreshchinskiy, *"Primenenie Artillerii v Lokal'nykh Voynakh I Vooruzhennykh Konfliktakh"* ["Employment of Artillery in Local Wars and Military Conflicts"], *Voennaya Mysl'* [*Military Thought*], May-June 1996, 26-27.
10. Ibid, 28.
11. Grau, *The Bear...*, 3, 25, 45 and 71.
12. In the Soviet Ground Forces, mortars, antitank guns and antitank guided missiles were artillery weapons. Artillerymen were integrated into motorized rifle battalions to operate the organic mortars and antitank systems.
13. Karatuev, 26.
14. Grau, *The Bear...*, 24-26.
15. Karatuev, 27.
16. Sweeping fire is an offensive rolling barrage with lessened densities of frontage. In a regular offensive rolling barrage, the Soviets used one artillery piece of 100-mm or larger for every 25 meters of frontage for the rolling barrage. Sweeping fire could double or triple that frontage.
17. Karatuev, 27-28.
18. Grau, *The Bear...*, 15-18.
19. Boris V. Gromov, *Ogranichennyy Kontingent* [*Limited Contingent*], (Moscow: Progress, 1994), 186-187. General Gromov served three two-year tours in Afghanistan, the last as Commander of the 40th Army during its withdrawal.
20. Grau, *The Bear...*, 48-52.
21. Viktor Litvinenko, *"Novo to, Chto Khorosho Zabyto"* ["What is Completely Forgotten is Brand New"], *Armeiskiy Sbornik* [*Army Digest*], September 1996), 46. Colonel Litvinenko commanded an artillery regiment and was the chief of the 201st Motorized Rifle Division Artillery during 1984-1986 in Afghanistan.
22. Ibid.
23. Ibid, 45-46.
24. Litvinenko, 44.
25. Ibid.
26. Ibid.
27. Grau, *The Bear...*, 180-184, 189 and 192.
28. Lyakhovskiy, conversations with the author.
29. Litvinenko, 44.
30. Ibid, 44-45.
31. Ibid, 45.
32. Lyakhovskiy, Appendix.

ing and constant examination of tactics to get steel on the target accurately and rapidly. Second, maneuver and artillery must cooperate more closely than in conventional warfare and be tightly integrated at all times. Third, direct fire is a viable offensive firing technique—not just a defensive measure taken when enemy soldiers are "in the wire." Fourth, artillery assets can play a major, active role in convoy escort and accompaniment in rugged terrain. Fifth, cities and villages always will have civilians in them; gunners must develop techniques to fight around them. Sixth, PGM and other specialty rounds are playing an increasing role in counterinsurgency. Seventh, the biggest problem artillery has in counter-insurgency is finding a viable target.

During the war, the Soviet gunners developed firing techniques, nomographs and firing tables to cope with the enemy, mountains and desert, but they were not enough to defeat the Mujahideen. In the end, the Mujahideen national will and ability to endure was decisive, and the Soviets withdrew after fighting for more than nine years.

After the war in Afghanistan, the Soviet Army was beset by the effects of a collapsing empire, faced overwhelming economic catastrophe and, apparently, decided to prepare only for high-tech conventional maneuver war—not for future counterinsurgencies. This decision to avoid guerrillas was in vain, however, as Soviet, and later Russian, forces again had to fight guerrillas in Tadjikistan, Azerbaidjan, Georgia and Chechnya. The Russians had to relearn the bitter lessons of Afghanistan because they had not incorporated them into their operations in the turbulent interim between counterinsurgencies.

Russian military science is now wrestling with conflicting visions of future war and, perhaps, the lessons of Afghanistan and the other guerrilla wars finally are being incorporated.

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GUARDFIST II—*Training the FO*

The guard unit armory device full-crew interactive simulation trainer—GUARDFIST II—is leading the way in virtual training for our forward observers (FOs). Developed by the Army National Guard (ARNG) and being fielded to ARNG and Active Army units, the portable, low-cost GUARDFIST II trains individual FOs. As shown in the picture, the GUARDFIST II has dual stations: one for training the FO and one for the instructor/operator (I/O).

The computer generates, monitors and controls the various simulated training scenarios, records FO performance, maintains a library of training exercises, generates the video and sound effects, processes input for the keyboard and trackball and performs test and diagnostic functions. The computer has a magnetic tape drive for updating the system with any new software that may be developed. It also includes expansion boards for video, graphics, digital message device (DMD) and communications interfaces.

Through manipulation of the trackball, the student can select the compass view and orient it on a target or point and with his binoculars, scan the terrain viewable from his observation post (OP) and select his binocular magnification of the scene. During conduct of the training, the monitor allows the FO to observe terrain, targets, projectile impact, height of burst, smoke, obscuration and illumination so he can make the necessary adjustments. The system includes a headset and microphone for the FO to transmit voice calls-for-fire and terminal posts to connect the GUARDFIST II to the lightweight computer unit (LCU) for the FO to communicate digitally with the fire direction center (FDC).

In the near future, the GUARDFIST II will become an integral part of the fire support combined arms tactical trainer (FSCATT) that will be the indirect fire portion of the Army's combined arms tactical trainer (CATT). The FSCATT will be a "system of systems" that fully integrates the training of the entire gunnery team—FO, FDC and weapons crew members. GUARDFIST II will provide the FO station in the training loop.

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